WSM

WORKSHOP MANUAL

F2880,F3680,RCK72P-F36, RCK72R-F36,RCK60P-F36, RCK60R-F36

Kubota

KiSC issued 02, 2016 A

TO THE READER

This Workshop Manual has been prepared to provide servicing personnel with information on the mechanism, service and maintenance of KUBOTA F2880, F3680, KUBOTA Mower RCK72P-F36, RCK72R-F36, RCK60P-F36, RCK60R-F36. It is divided into three parts, “General”, “Mechanism” and “Servicing” for each section.

■ **General**

Information on the tractor identification, the general precautions, maintenance check list, check and maintenance and special tools are described.

■ **Mechanism**

Information on the construction and function are included. This part should be understood before proceeding with troubleshooting, disassembling and servicing.

Refer to Diesel Engine / Tractor Mechanism Workshop Manual (Code No. 9Y021-01874 / 9Y021-18201) for the one which has not been described to this workshop manual.

■ **Servicing**

Information on the troubleshooting, servicing specification lists, tightening torque, checking and adjusting, disassembling and assembling and servicing which cover procedures, precautions, factory specifications and allowable limits.

All information illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

The right is reserved to make changes in all information at any time without notice.

May 2006

KiSC issued 02, 2016 A

Record of Revisions

For pdf, use search function {Search word} to find all the revised locations.

Last digit of the Code No.	Issue month	Main Revised Point and Corrective Measures {Search word}	Reference Page
2	2016.02	Revised Maintenance Intervals	G-10, G-11, 9-S4

SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully.

It is essential that you read the instructions and safety regulations before you attempt to repair or use this unit.

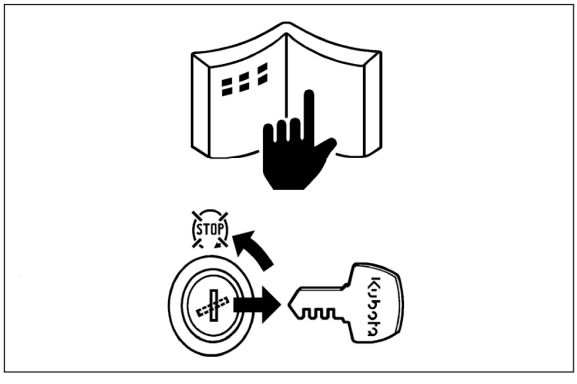
DANGER : **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

WARNING : **Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

CAUTION : **Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

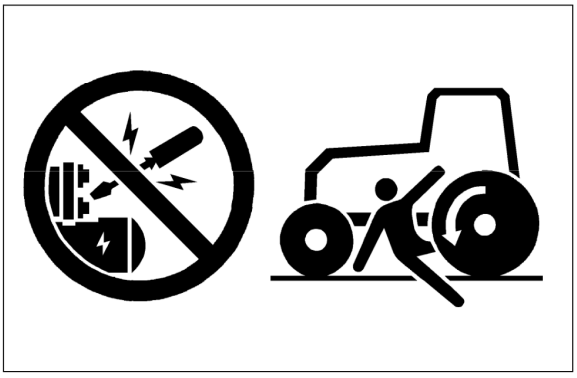
■ **IMPORTANT** : **Indicates that equipment or property damage could result if instructions are not followed.**

■ **NOTE** : **Gives helpful information.**



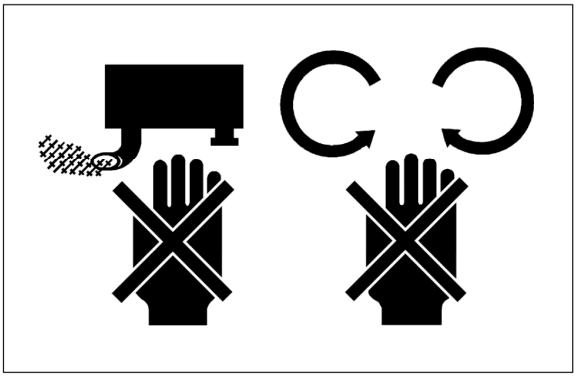
BEFORE SERVICING AND REPAIRING

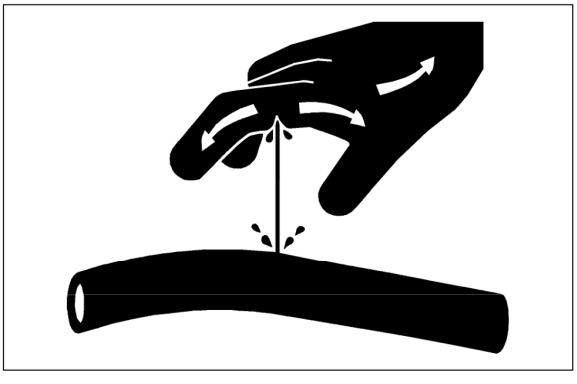
- Read all instructions including safety instructions in this manual and your machine safety decals.
- Clean the work area and machine.
- Park the machine on firm and level ground, and set the parking brake.
- Lower the implement to the ground.
- Stop the engine, and remove the key.
- Disconnect the battery negative cable.
- Hang a "**DO NOT OPERATE**" tag on the operators platform.



SAFETY STARTING

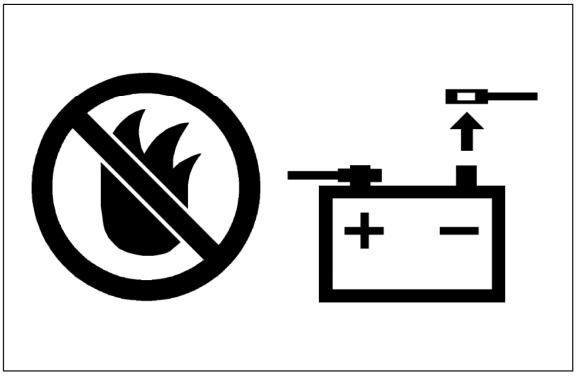
- Do not start the engine by shorting across starter terminals or bypassing the safety start switch.
- Do not alter or remove any part of machine safety system.
- Before starting the engine, make sure that all shift levers are in neutral positions or in disengaged positions.
- Never start the engine while standing on the ground. Start the engine only from operator's seat.





SAFETY WORKING

- Do not work on the machine while under the influence of alcohol, medication, or other substances or while fatigued.
- Wear close fitting clothing and safety equipment appropriate to the job.
- Use tools appropriate to the work. Makeshift tools, parts, and procedures are not recommended.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Do not work under the machine that is supported solely by a jack. Always support the machine by safety stands.
- Do not touch the rotating or hot parts while the engine is running.
- Never remove the radiator cap while the engine is running, or immediately after stopping. Otherwise, hot water will spout out from radiator. Only remove radiator cap when cool enough to touch with bare hands. Slowly loosen the cap to first stop to relieve pressure before removing completely.
- Escaping fluid (fuel or hydraulic oil) under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic or fuel lines. Tighten all connections before applying pressure.

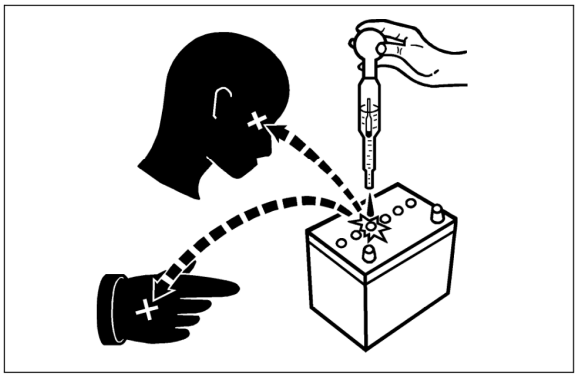


AVOID FIRES

- Fuel is extremely flammable and explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.
- To avoid sparks from an accidental short circuit, always disconnect the battery negative cable first and connect it last.
- Battery gas can explode. Keep sparks and open flame away from the top of battery, especially when charging the battery.
- Make sure that no fuel has been spilled on the engine.

VENTILATE WORK AREA

- If the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust gas contains poisonous carbon monoxide.

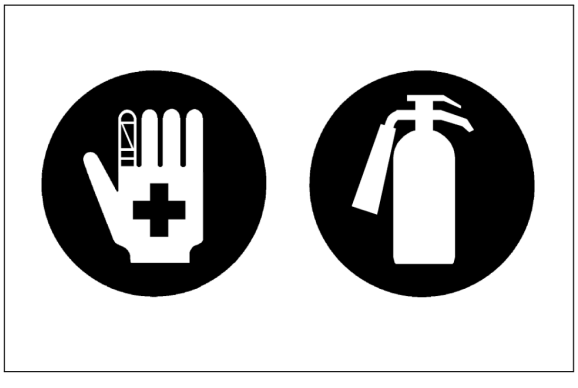


PREVENT ACID BURNS

- Sulfuric acid in battery electrolyte is poisonous. It is strong enough to burn skin, clothing and cause blindness if splashed into eyes. Keep electrolyte away from eyes, hands and clothing. If you spill electrolyte on yourself, flush with water, and get medical attention immediately.

DISPOSE OF FLUIDS PROPERLY

- Do not pour fluids into the ground, down a drain, or into a stream, pond, or lake. Observe relevant environmental protection regulations when disposing of oil, fuel, coolant, electrolyte and other harmful waste.

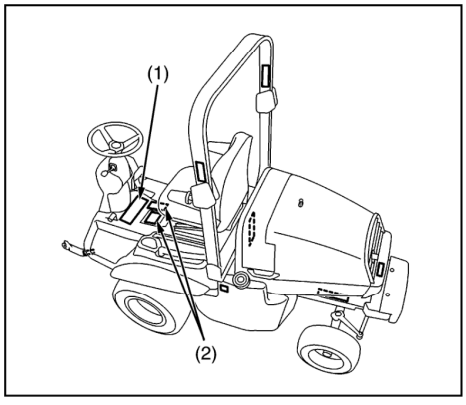


PREPARE FOR EMERGENCIES

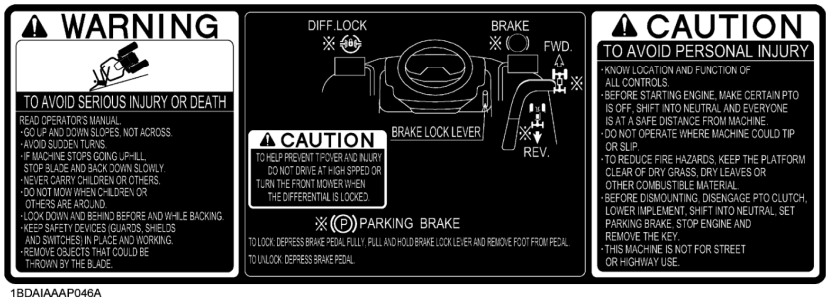
- Keep a first aid kit and fire extinguisher handy at all times.
- Keep emergency numbers for doctors, ambulance service, hospital and fire department near your telephone.

SAFETY DECALS

The following safety decals are installed on the machine.
If a decal becomes damaged, illegible or is not on the machine, replace it. The decal part number is listed in the parts list.



(1) Part No. K3611-4717-1



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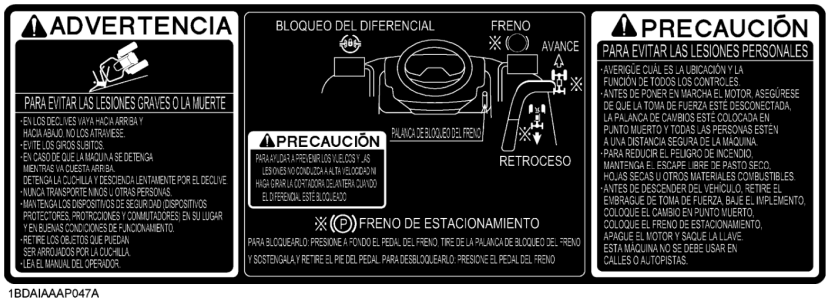
(2) Part No. K3611-4716-1



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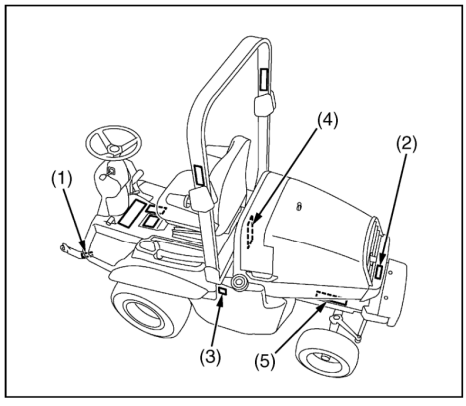
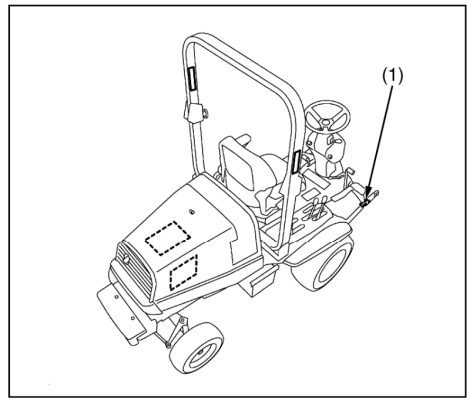
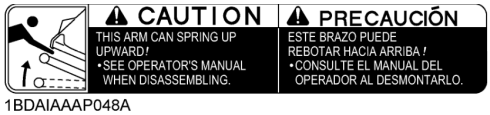




(1) Part No. K3611-4723-1



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(2) Part No. K3611-4728-1

1BDAIAAAP051A

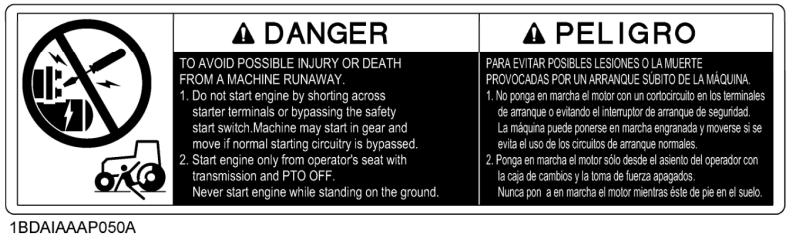
(3) Part No. K3611-4741-1

1BDAHADAP0300

(4) Part No. TA040-4957-1
Stay clear of engine fan and fan belt.

1BDABARAP113A

(5) Part No. K3611-4765-1



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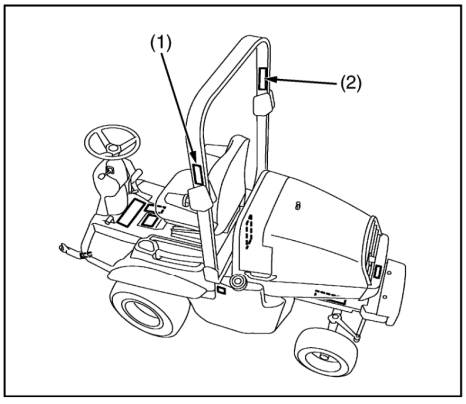

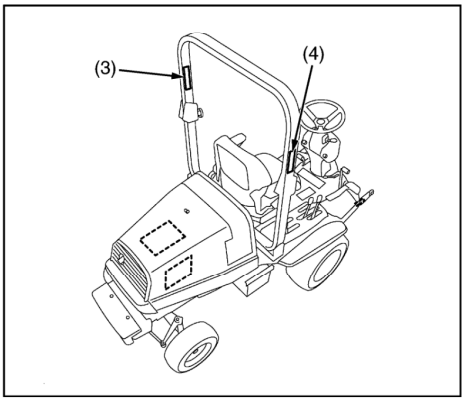

(1) Part No. K3611-8149-1

(2) Part No. K3611-8143-1

(3) Part No. 3A111-9554-1

(4) Part No. K3611-8148-1

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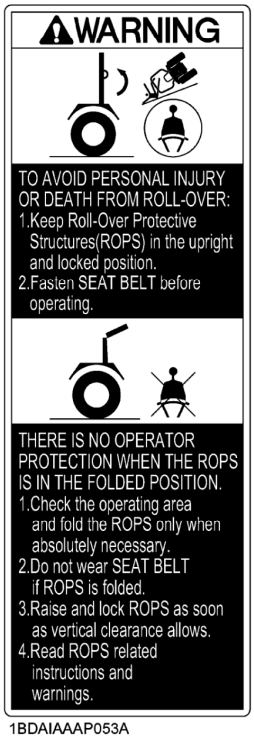

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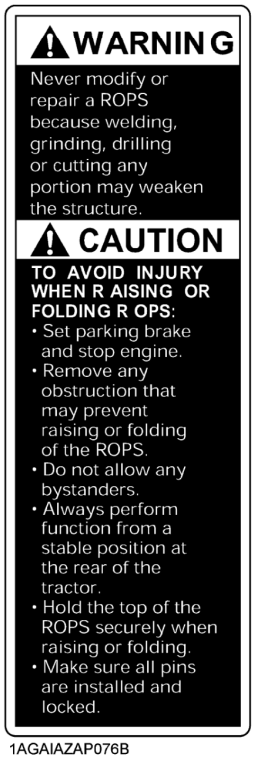

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SPECIFICATIONS

Model			F2880	F3680
Engine	Model		D1105-E2-FM2	V1505-E2-FM3
	Engine gross power (SAE) *1		20.4 kW (27.3 HP)	26.3 kW (35.3 HP)
	Type		Indirect Injection, vertical, water-cooled, 4-cycle diesel	
	Number of cylinders		3	4
	Bore and stroke		78.0 × 78.4 mm (3.07 × 3.09 in.)	
	Total displacement		1123 cm^3 (68.58 cu.in.)	1498 cm^3 (91.42 cu.in.)
	Rated revolution		3000min^{-1} (rpm)	
	Starting system		Electric starter 12 V, 1.1 kW	
	Lubricating system		Forced lubrication by gear pump	
	Cooling system		Pressurized radiator, forced circulation with water pump	
	Battery		12 V, CCA : 490 A, RC : 112 min.	
	Fuel		Diesel fuel No. 1 [below −10 °C (14 °F)] Diesel fuel No. 2-D	
Capacities	Fuel tank		61 L (16.1 U.S.gals, 13.4 Imp.gals)	
	Engine crankcase		3.8 L (4.0 U.S.qts., 3.3 Imp.qts)	
	Engine coolant		4.6 L (4.9 U.S.qts., 4.0 Imp.qts)	
	Recovery tank		0.6 L (0.6 U.S.qts, 0.5 Imp.qts)	
	Transmission case		14.0 L (14.8 U.S.qts, 12.3 Imp.qts)	
	Rear axle differential case		1.5 L (1.59 U.S.qts, 1.32 Imp.qts)	
	Rear axle gear case		0.5 L (0.53 U.S.qts, 0.44 Imp.qts)	
Tire	Front		24 × 12 – 12 (4PR) Turf	
	Rear		18 × 9.5 – 8 (4PR) Turf	
Travelling speeds	Forward	Low	0 to 9.0 km/h (0 to 5.6 mph) *2	
		High	0 to 20.0 km/h (0 to 12.6 mph) *2	
	Reverse	Low	0 to 4.8 km/h (0 to 3.0 mph) *2	
		High	0 to 11.0 km/h (0 to 6.9 mph) *2	
Dimensions	Overall length		2500 mm (98.4 in.)	
	Overall width		1370 mm (53.9 in.)	
	Overall height	without ROPS	1350 mm (53.1 in.)	
		with ROPS	1985 mm (78.2 in.)	
	Wheel base		1300 mm (51.2 in.)	
	Min. ground clearance		185 mm (7.3 in.)	
	Tread	Front	1063 mm (41.9 in.)	
		Rear	1020 mm (40.2 in.)	
Weight (without mower deck)			727 kg (1603 lbs)	744 kg (1640 lbs)

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Model		F2880	F3680
PTO	Revolution	1 speed (2545 rpm at 3000 engine rpm)	
	Drive system	Shaft drive. KUBOTA 10-tooth involute spline (2545 rpm)	
	Clutch type	Wet multi plates	
	PTO brake	Wet single plate	
Steering		Hydraulic power steering	
Transmission		Hydrostatic transmission, High-Low gear shift (2 forward, 2 reverse)	
Brake		Wet disk type	
Minimum turning radius		Less than 750 mm (29.5 in.) (inside of front tire)	
Differential	Front	Bevel gear	
	Rear	Bevel gear	
4WD system		Dual-acting overrunning 4WD	

(Specifications and design subject to change without notice)
NOTE: *1 : Manufacture's estimate.
*2 : At 2700 engine min^{-1} (rpm).

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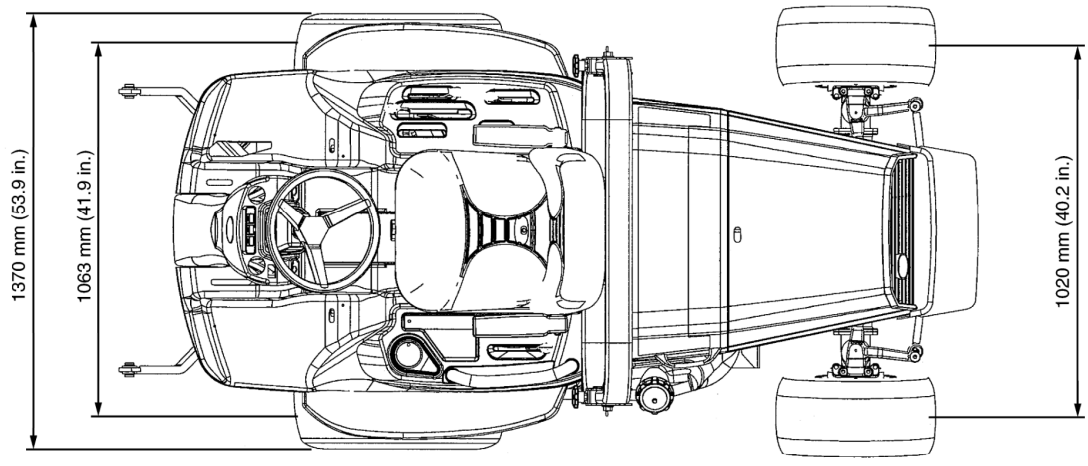
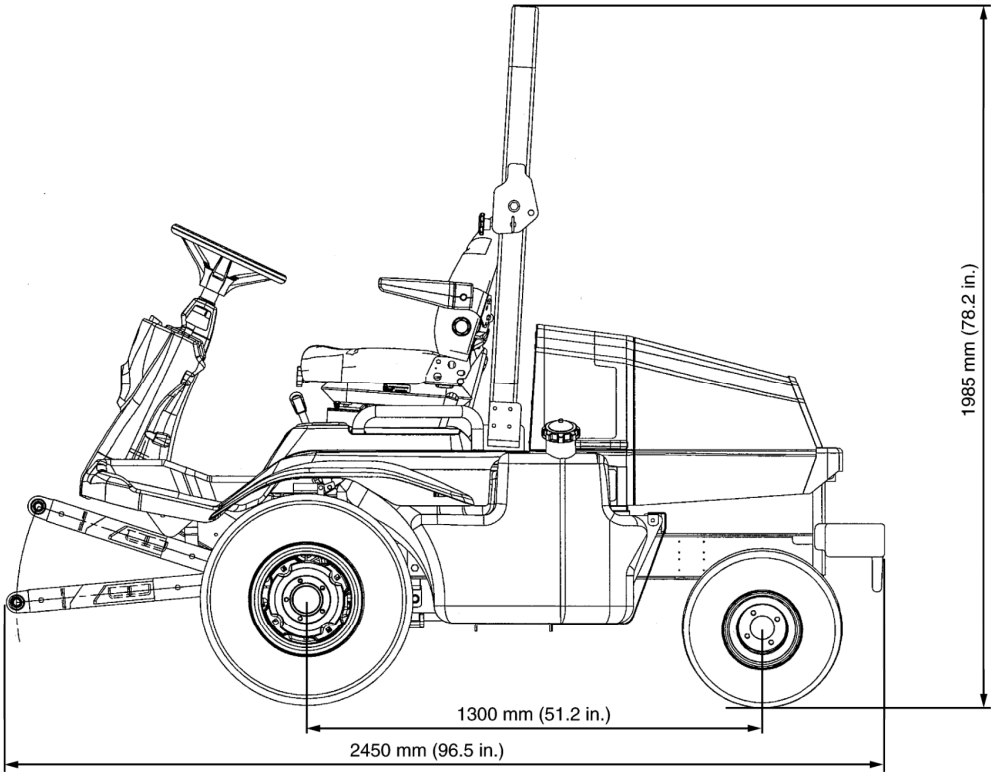
DIMENSIONS





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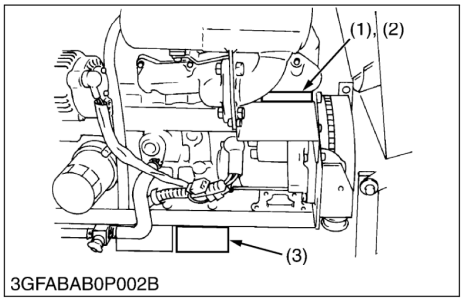
G GENERAL

GENERAL

CONTENTS

1. IDENTIFICATION



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When contacting your local KUBOTA distributor, always specify engine model name, engine serial number and machine serial number.

■ Engine Serial Number

The engine serial number is an identified number for the engine. It is marked after the engine model number.

It indicates month and year of manufacture as follows.

- **Year of manufacture**

Alphabet or Number	Year	Alphabet or Number	Year
1	2001	F	2015
2	2002	G	2016
3	2003	H	2017
4	2004	J	2018
5	2005	K	2019
6	2006	L	2020
7	2007	M	2021
8	2008	N	2022
9	2009	P	2023
A	2010	R	2024
B	2011	S	2025
C	2012	T	2026
D	2013	V	2027
E	2014		

- **Month of manufacture**

Month	Engine Serial Number	
	0001 ~ 9999	10000 ~
January	A0001 ~ A9999	B0001 ~
February	C0001 ~ C9999	D0001 ~
March	E0001 ~ E9999	F0001 ~
April	G0001 ~ G9999	H0001 ~
May	J0001 ~ J9999	K0001 ~
June	L0001 ~ L9999	M0001 ~
July	N0001 ~ N9999	P0001 ~
August	Q0001 ~ Q9999	R0001 ~
September	S0001 ~ S9999	T0001 ~
October	U0001 ~ U9999	V0001 ~
November	W0001 ~ W9999	X0001 ~
December	Y0001 ~ Y9999	Z0001 ~

e.g. D1105-5A0001

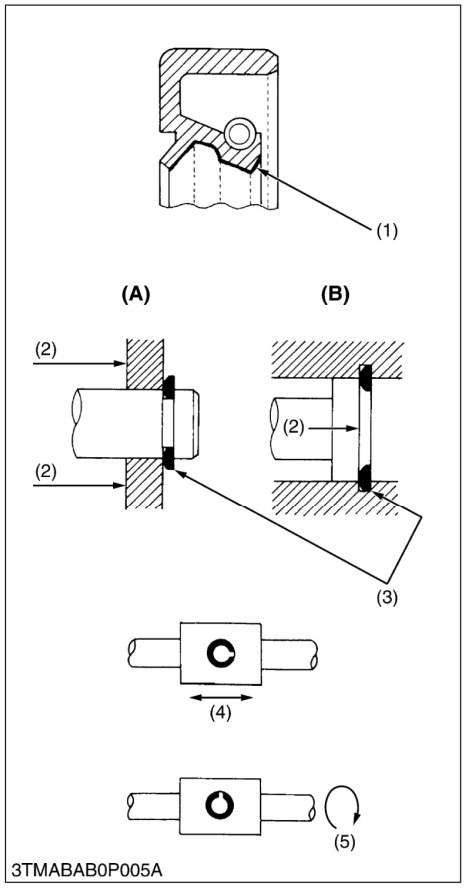
“5” indicates 2005 and “A” indicates January.

So, 5A indicates that the engine was manufactured in January, 2005.

(1) Engine Model Name
(2) Engine Serial Number
(3) Machine Serial Number

W1010714

2. GENERAL PRECAUTIONS



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- During disassembly, carefully arrange removed parts in a clean area to prevent confusion later. Screws, bolts and nuts should be installed in their original position to prevent reassembly errors.
- When special tools are required, use KUBOTA genuine special tools. Special tools which are not frequently used should be made according to the drawings provided.
- Before disassembling or servicing electrical wires, always disconnect the ground cable from the battery first.
- Remove oil and dirt from parts before measuring.
- Use only KUBOTA genuine parts for parts replacement to maintain machine performance and to assure safety.
- Gaskets and O-rings must be replaced during reassembly. Apply grease to new O-rings or oil seals before assembling. See the figure left side.
- When reassembling external snap rings or internal snap rings, they must be positioned so that sharp edge faces against the direction from which a force is applied. See the figure left side.
- When inserting spring pins, their splits must face the direction from which a force is applied. See the figure left side.
- To prevent damage to the hydraulic system, use only specified fluid or equivalent.

(1) Grease
(2) Force
(3) Sharp Edge
(4) Axial Force
(5) Rotating Movement

(A) External Snap Ring
(B) Internal Snap Ring

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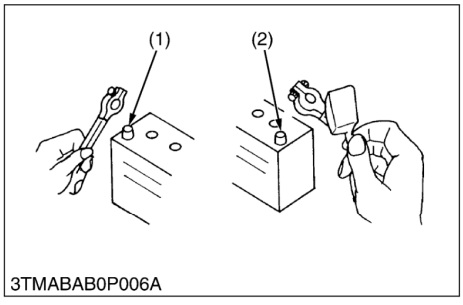
3. HANDLING PRECAUTIONS FOR ELECTRICAL PARTS AND WIRING



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To ensure safety and prevent damage to the machine and surrounding equipment, heed the following precautions in handling electrical parts and wiring.

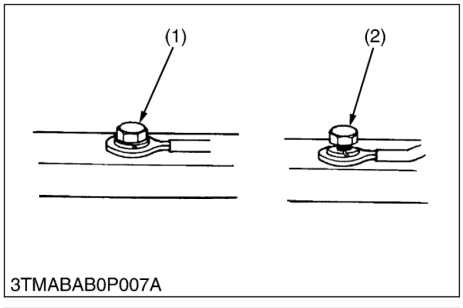
■ **IMPORTANT**

- **Check electrical wiring for damage and loosened connection every year. To this end, educate the customer to do his or her own check and at the same time recommend the dealer to perform periodic check.**
- **Do not attempt to modify any electrical parts and wiring.**
- **When removing the battery cables, disconnect the negative cable first. When installing the battery cables, connect the positive cable first.**

(1) Negative Terminal (2) Positive Terminal

W10111140

[1] WIRING



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- Securely tighten wiring terminals.

(1) Correct (Securely Tighten) (2) Incorrect (Loosening Leads to Faulty Contact)

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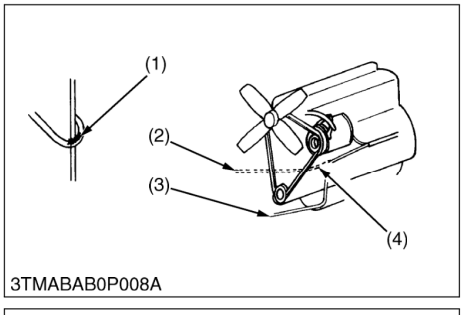
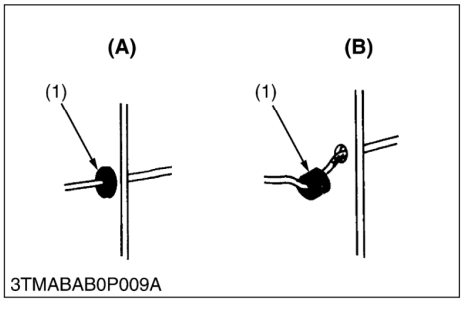


3TMABAB0P008A

- Do not let wiring contact dangerous part.

(1) Dangerous Part (3) Wiring (Correct)
(2) Wiring (Incorrect) (4) Dangerous Part

W10113130



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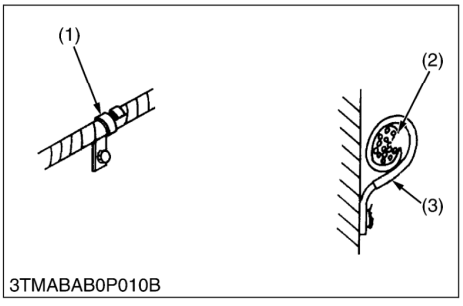
- Securely insert grommet.

(1) Grommet **(A) Correct** **(B) Incorrect**

W10113880

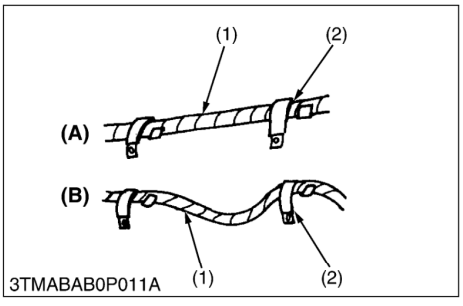


3TMABAB0P010B

- Securely clamp, being careful not to damage wiring.

(1) Clamp
  • Wind Clamp Spirally
(2) Wire Harness
(3) Clamp

W10114580



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- Clamp wiring so that there is no twist, unnecessary sag, or excessive tension, except for movable part, where sag may be required.

(1) Wiring
(2) Clamp
(A) Correct
(B) Incorrect

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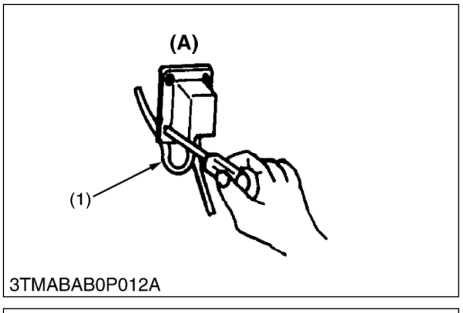

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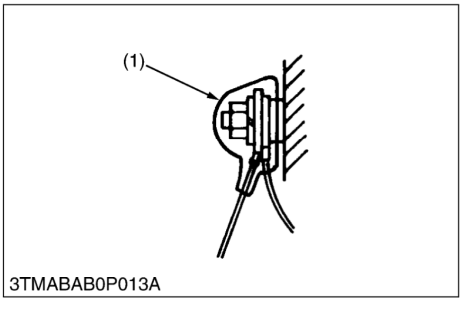
- When installing a part, take care not to trap or damage the wiring.

(1) Wiring
(A) Incorrect

W10116700



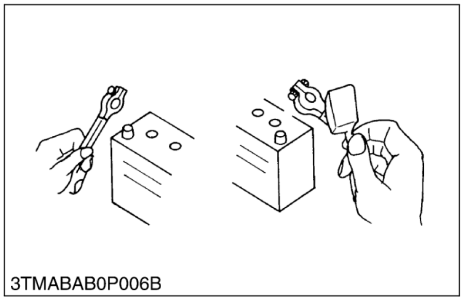
3TMABAB0P013A

- After installing wiring, check protection of terminals and clamped condition of wiring before connecting battery.

(1) Cover
  • Securely Install Cover

W10117350

[2] BATTERY


3TMABAB0P006B

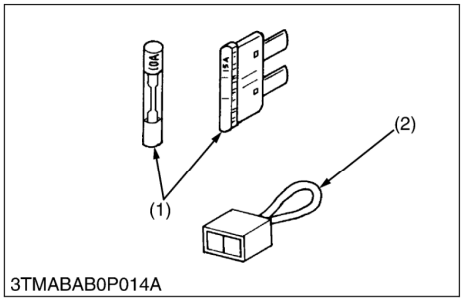
- Take care not to confuse positive and negative terminal posts.
- When removing battery cables, disconnect negative cable first. When installing battery cables, check for polarity and connect positive cable first.
- Do not install any battery with capacity other than is specified (Ah).
- After connecting cables to battery terminal posts, apply high temperature grease to them and securely install terminal covers.
- Do not allow dirt and dust to collect on battery.

CAUTION

- **Take care not to let battery liquid spill on your skin and clothes. If contaminated, wash it off with water immediately.**
- **Before recharging the battery, remove it from the machine.**
- **Before recharging, remove cell caps.**
- **Recharging should take place in a well-ventilated place where there is no open flame nearby, as hydrogen gas and oxygen are produced, which is highly flammable.**

W10118160

[3] FUSE



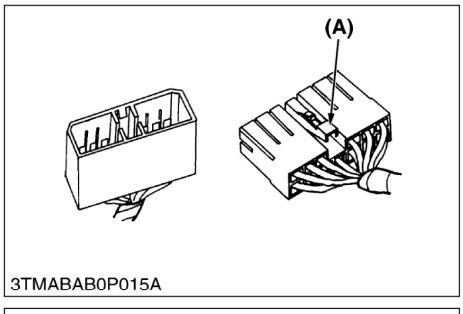
3TMABAB0P014A

- Use fuses with specified capacity.
  Neither too large or small capacity fuse is acceptable.
- Never use steel or copper wire in place of fuse.
- Do not install working light, radio set, etc. on machine without a separate power supply.
- Do not install accessories if fuse capacity of reserve power supply is exceeded.

(1) Fuse (2) Slow Blow Fuse

W10120920

[4] CONNECTOR

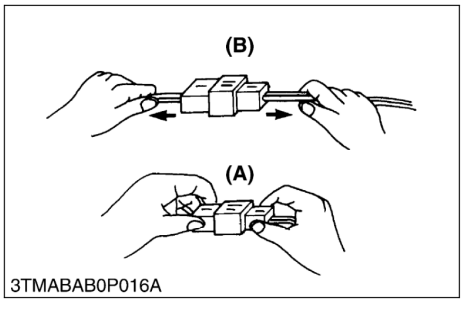


3TMABAB0P015A

- For connector with lock, push lock to separate.

(A) Push

W10122110

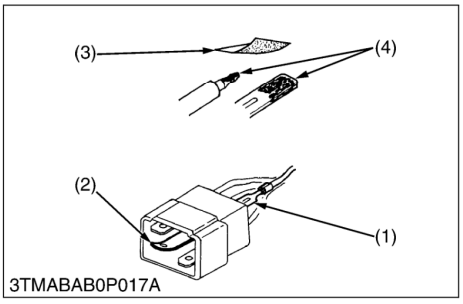


3TMABAB0P016A

- In separating connectors, do not pull wire harnesses.
- Hold connector bodies to separate.

(A) Correct **(B) Incorrect**

W10122720

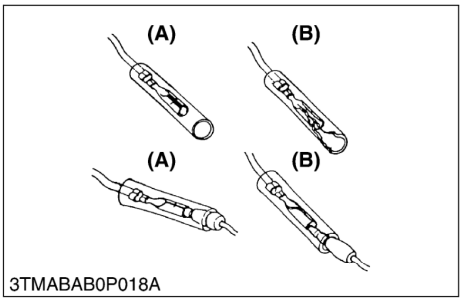


3TMABAB0P017A

- Use sandpaper to remove rust from terminals.
- Repair damaged terminals. Make certain there is no terminal being exposed or displaced.

(1) Exposed Terminal
(2) Deformed Terminal
(3) Sandpaper
(4) Rust

W10123460

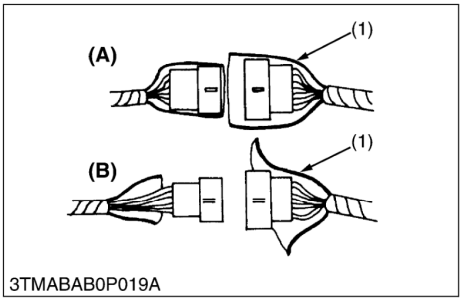


3TMABAB0P018A

- Make certain that there is no uninsulated femal connectors.

(A) Correct
(B) Incorrect

W10124300



3TMABAB0P019A

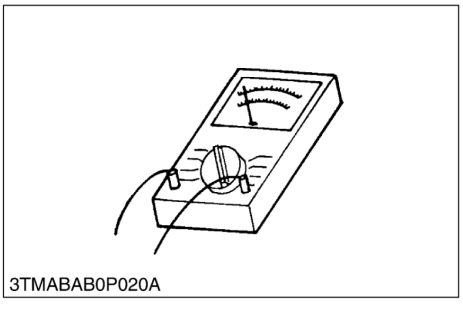
- Make certain the plastic cover is large enough to cover whole connector.

(1) Cover

(A) Correct
(B) Incorrect

W10125190

[5] HANDLING OF CIRCUIT TESTER


3TMABAB0P020A

- Use the tester, according to its own operating instructions.
- Check for polarity and range.

W10126840

4. LUBRICANTS, FUEL AND COOLANT

No.	Place		Capacity		Lubricants, fuel and coolant
			F2880	F3680	
1	Fuel		61 L 16.1 U.S.gals 13.4 Imp.gals		No. 2-D diesel fuel No.1-D diesel fuel if temperature is below – 10 °C (14 °F)
2	Coolant	Cooling system	4.6 L 4.9 U.S.qts 4.0 Imp.qts		Fresh clean water with anti-freeze
		Recovery tank	0.6 L 0.6 U.S.qts 0.5 Imp.qts		
3	Engine crankcase		3.8 L 4.0 U.S.qts 3.3 Imp.qts	5.3 L 5.6 U.S.qts 4.7 Imp.qts	Engine oil : API Service Classification CD, CE or CF Below 0 °C (32 °F) : SAE10W, 10W-30 or 10W-40 0 to 25 °C (32 to 77 °F): SAE20, 10W-30 or 10W-40 Above 25 °C (77 °F): SAE30, 10W-30 or 10W-40
4	Transmission case		14.0 L 14.8 U.S.qts 12.3 Imp.qts		KUBOTA UDT or SUPER UDT fluid*
5	Rear axle differential case		1.5 L 1.59 U.S.qts 1.32 Imp.qts		KUBOTA UDT, SUPER UDT fluid* or SAE85W, SAE90 gear oil (API Service Classification : more than GL-3)
6	Rear axle gear case		0.5 L 0.53 U.S.qts 0.44 Imp.qts		

* KUBOTA original transmission hydraulic fluid.

Greasing	No. of greasing points		Capacity	Type of grease
	F2880	F3680		
Speed control pedal shaft	1		Until grease overflows	Multipurpose Grease NLGI-2 or NLGI-1 (GC-LB)
Link pivots (RH and LH)	2			
Differential lock pedal boss	1			
Universal joint	1			
Rear wheel drive shaft (Front and Rear)	2			
Knuckle arm (RH and LH)	2			
Seat adjuster	2		Moderate amount	Oil
HST neutral shaft	1			
Cable (Throttle)	1			

5. TIGHTENING TORQUES

[1] GENERAL USE SCREWS, BOLTS AND NUTS

Screws, bolts and nuts whose tightening torques are not specified in this Workshop Manual should be tightened according to the table below.

Indication on top of bolt	⬡ 4 No-grade or 4T						⬡ 7 7T						⬡ 9 9T		
Material of bolt	SS400, S20C						S43C, S48C						SCr435, SCM435		
Material of opponent part	Ordinariness			Aluminum			Ordinariness			Aluminum			Ordinariness		
Unit / Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M6 (6 mm, 0.24 in.)	7.85 to 9.31	0.80 to 0.95	5.79 to 6.87	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	9.81 to 11.2	1.00 to 1.15	7.24 to 8.31	7.85 to 8.82	0.80 to 0.90	5.79 to 6.50	12.3 to 14.2	1.25 to 1.45	9.05 to 10.4
M8 (8 mm, 0.31 in.)	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	16.7 to 19.6	1.7 to 2.0	12.3 to 14.4	23.6 to 27.4	2.4 to 2.8	17.4 to 20.2	17.7 to 20.5	1.8 to 2.1	13.1 to 15.1	29.5 to 34.3	3.0 to 3.5	21.7 to 25.3
M10 (10 mm, 0.39 in.)	39.3 to 45.1	4.0 to 4.6	29.0 to 33.2	31.4 to 34.3	3.2 to 3.5	23.2 to 25.3	48.1 to 55.8	4.9 to 5.7	35.5 to 41.2	39.3 to 44.1	4.0 to 4.5	29.0 to 32.5	60.9 to 70.6	6.2 to 7.2	44.9 to 52.0
M12 (12 mm, 0.47 in.)	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	–	–	–	77.5 to 90.2	7.9 to 9.2	57.2 to 66.5	62.8 to 72.5	6.4 to 7.4	46.3 to 53.5	103 to 117	10.5 to 12.0	76.0 to 86.7
M14 (14 mm, 0.55 in.)	108 to 125	11.0 to 12.8	79.6 to 92.5	–	–	–	124 to 147	12.6 to 15.0	91.2 to 108	–	–	–	167 to 196	17.0 to 20.0	123 to 144
M16 (16 mm, 0.63 in.)	167 to 191	17.0 to 19.5	123 to 141	–	–	–	197 to 225	20.0 to 23.0	145 to 166	–	–	–	260 to 304	26.5 to 31.0	192 to 224
M18 (18 mm, 0.71 in.)	246 to 284	25.0 to 29.0	181 to 209	–	–	–	275 to 318	28.0 to 32.5	203 to 235	–	–	–	344 to 402	35.0 to 41.0	254 to 296
M20 (20 mm, 0.79 in.)	334 to 392	34.0 to 40.0	246 to 289	–	–	–	368 to 431	37.5 to 44.0	272 to 318	–	–	–	491 to 568	50.0 to 58.0	362 to 419

W1034542

[2] METRIC SCREWS, BOLTS AND NUTS

Grade	Property class 8.8 ⬡ 8.8			Property class 10.9 ⬡ 10.9		
Unit / Nominal Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
M8	23.6 to 27.4	2.40 to 2.80	17.4 to 20.2	29.4 to 34.3	3.00 to 3.50	21.7 to 25.3
M10	48.1 to 55.8	4.90 to 5.70	35.5 to 41.2	60.8 to 70.5	6.20 to 7.20	44.9 to 52.1
M12	77.5 to 90.1	7.90 to 9.20	57.2 to 66.5	103.0 to 117.0	10.50 to 12.00	76.0 to 86.8
M14	124.0 to 147.0	12.60 to 15.00	91.2 to 108.0	167.0 to 196.0	17.00 to 20.00	123.0 to 144.0
M16	196.0 to 255.0	20.0 to 23.0	145.0 to 166.0	260.0 to 303.0	26.50 to 31.00	192.0 to 224.0

W1013689

[3] AMERICAN STANDARD SCREWS, BOLTS AND NUTS WITH UNC OR UNF THREADS

Grade	SAE GR.5			SAE GR.8		
Unit / Nominal Diameter	N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
5/16	23.1 to 27.8	2.35 to 2.84	17.0 to 20.5	32.5 to 39.3	3.31 to 4.01	24.0 to 29.0
3/8	47.5 to 57.0	4.84 to 5.82	35.0 to 42.0	61.0 to 73.2	6.22 to 7.47	45.0 to 54.0
1/2	108.5 to 130.2	11.07 to 13.29	80.0 to 96.0	149.2 to 179.0	15.22 to 18.27	110.0 to 132.0
9/16	149.2 to 179.0	15.22 to 18.27	110.0 to 132.0	217.0 to 260.4	22.14 to 26.57	160.0 to 192.0
5/8	203.4 to 244.1	20.75 to 24.91	150.0 to 180.0	298.3 to 358.0	30.44 to 36.53	220.0 to 264.0

W1022485

[4] PLUGS

Shape	Size	Material of opponent part					
		Ordinariness			Aluminum		
		N·m	kgf·m	lbf·ft	N·m	kgf·m	lbf·ft
Tapered screw 	R1/8	13 to 22	1.3 to 2.2	9.6 to 16.2	10 to 12	1.0 to 1.2	7.4 to 8.9
	R1/4	29 to 44	3.0 to 4.5	21.4 to 32.5	20 to 29	2.0 to 3.0	14.8 to 21.4
Straight screw 	G1/4	29 to 39	3.0 to 4.0	21.4 to 28.8	–	–	–
	G3/8	49 to 59	5.0 to 6.0	36.1 to 43.5	–	–	–
	G1/2	59 to 78	6.0 to 8.0	43.5 to 57.5	–	–	–

0000001666E

6. MAINTENANCE CHECK LIST

■ **IMPORTANT**

- **The jobs indicated by "★" must be done initially during pre-delivery inspection.**
- ***1 : This maintenance should be done daily more in dusty conditions than in normal conditions. Suggested cleaning interval is every 100 hours in normal conditions.**
- **The items listed above (@ marked) are registered as emission related critical parts by KUBOTA in the U.S.EPA nonroad emission regulation. As the engine owner, you are responsible for the performance of the required maintenance on the engine according to the above instruction.**

No.	Item \ Period		Service Interval												After since	Important		Reference page
			50	100	150	200	250	300	350	400	450	500	550	600				
1	Safety device	Check	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-19
2	Greasing	–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-20
3	Oiling	–	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	every 50 Hr			G-21
4	Battery condition	Check		☆		☆		☆		☆		☆		☆	every 100 Hr			G-23
5	Air cleaner element	Clean		☆		☆		☆		☆		☆		☆	every 100 Hr	*1	@	G-23
		Replace													every 4 years			G-31
6	Engine oil	Change	★			☆				☆				☆	every 200 Hr			G-17
7	Fan belt	Adjust		☆		☆		☆		☆		☆		☆	every 100 Hr			G-24
8	Brake pedal free travel	Adjust		☆		☆		☆		☆		☆		☆	every 100 Hr			G-24
9	Fuel filter	Check		☆		☆		☆		☆		☆		☆	every 100 Hr		@	G-24
		Replace								☆					every 400 Hr			G-26
10	Engine oil filter cartridge	Replace	★			☆				☆				☆	every 200 Hr			G-17
11	Transmission fluid	Change				★				☆					every 400 Hr			G-25
12	Transmission oil filter cartridge	Replace	★			☆				☆				☆	every 200 Hr	*1		G-18
13	Transmission oil strainer	Clean				★				☆					every 400 Hr			G-25
14	Rear axle differential case fluid	Change				★				☆					every 400 Hr			G-26
15	Rear axle gear case (RH and LH) fluid	Change				★				☆					every 400 Hr			G-26
16	Radiator hose and clamp	Check													every 1 year			G-29
		Replace													every 4 years			G-31
17	Hydraulic hose	Check													every 1 year			G-29
		Replace													every 4 years			G-31

W1035769

(Continued)

No.	Item \ Period		Service Interval												After since	Important		Reference page
			50	100	150	200	250	300	350	400	450	500	550	600				
18	Fuel line	Check													every 1 year		@	G-30
		Replace													every 4 years			G-31
19	Intake air line	Check													every 1 year		@	G-30
		Replace													every 4 years			–
20	Rear axle pivot	Adjust								☆					every 400 Hr			G-26
21	Fuel injection nozzle (injection pressure)	Check													every 1500 Hr		@	G-27
22	Injection pump	Check													every 3000 Hr		@	G-28
23	Radiator	Clean													every 2000 Hr or 2 years			G-27
24	Coolant	Change													every 2000 Hr or 2 years		@	G-27
25	Fuel system	Bleed													Service as Required			G-32
26	Fuse	Replace																G-32
27	Light bulb	Replace																G-32
28	Lift spring	Adjust																G-32

W1023987

7. CHECK AND MAINTENANCE

CAUTION

- **Be sure to check and service the machine on a flat area with engine shut off, the parking brake set and chock the weel.**

[1] DAILY CHECK

To prevent trouble from occurring, it is important to know the condition of the machine. Check the following items before starting.

Checking

- Walk around the machine.

1. The tire pressure, wear and damage
2. Oil and water leak
3. Engine oil level
4. Transmission fluid level
5. Battery electrolyte
6. Coolant level in the recovery tank
7. Damage of machine body, tightness of all screws, bolts and nuts
8. Radiator screen
9. Bonnet screen
10. Brake pedal free travel
11. Fuel level
12. Air cleaner

- While sitting in the operator's seat

1. Speed control pedal
2. Brake pedal
3. Parking brake

- Turning the key switch **"ON"**.

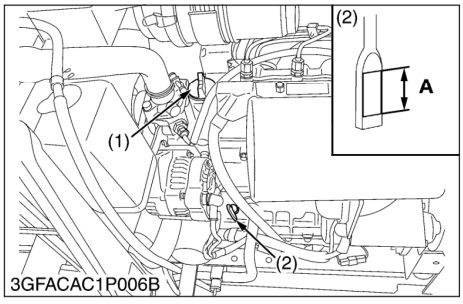
1. Performance of the easy checker light
2. Head light

- Starting the engine.

1. Color of the exhaust fumes
2. Safety start switch, seat safety control and another safety devices
3. Check for abnormal noise and vibration

- Others.

1. Check the areas where previous trouble was experienced



Checking Engine Oil Level

CAUTION

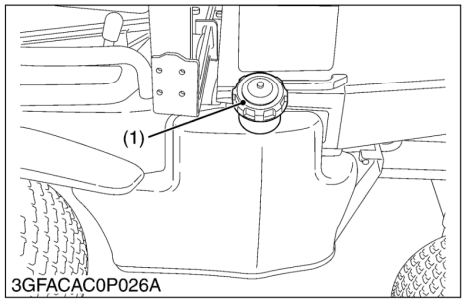
- **Always stop the engine and remove the key before checking oil.**

1. Check engine oil before starting and 5 minutes or more after the engine has stopped.
2. Wipe dipstick (2) area clean.
3. To check the oil level, remove the dipstick (2), wipe it clean, reinsert it, and draw it out again. Check to see that the oil level is between the two notches.
4. Add new oil to the prescribed level at the oil inlet (1) if necessary.
5. When using a different brand or viscosity oil from the previous one, remove all of the old oil and oil filter. Never mix two different types of oil.
6. Use the proper Engine Oil SAE according to the ambient temperatures. (See page G-7.)

(1) Engine Oil Inlet
(2) Oil Level Dipstick

A : Oil level is acceptable within this range

W1047516



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Checking Amount of Fuel and Refueling

CAUTION

- **Handle fuel carefully. If the engine is running, do not fill the fuel tank. If engine is hot, let engine cool for several minutes before adding fuel.**
  Do not smoke while filling the fuel tank or servicing the fuel system. Fill fuel tank only to bottom of filler neck.

Check the fuel level. Take care that the fuel tank does not become empty.

Fuel tank capacity	61 L 16.1 U.S.gals 13.4 Imp.gals

■ IMPORTANT

- **Use Diesel Fuel Only.**

1. Use No.2-D diesel fuel.
2. Use No.1-D diesel fuel if the temperature is below -10 °C (14 °F).
3. Always use a strainer when refueling to prevent fuel injection pump contamination.

■ NOTE

- **No.2-D is a distillate fuel of lower volatility for engines in industrial and heavy mobile service.**
  (SAE J313 JUN87)
  Grade of Diesel Fuel Oil according to ASTM D975

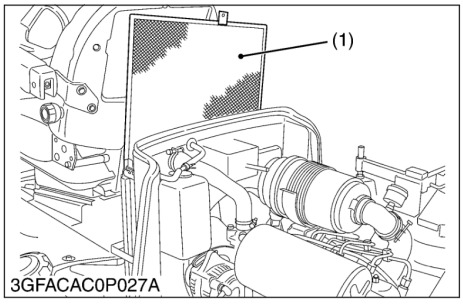
Flash point °C	Water and sediment, volume %	Carbon residue on, 10 percent residuum %	Ash, weight %
Min	Max	Max	Max
52	0.05	0.35	0.01

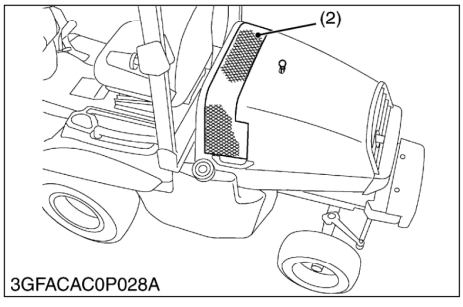
Distillation temperatures °C 90 % point		Kinematics viscosity cSt or mm^2/S at 40 °C		Saybolt viscosity, SUS at 100 °F	
Min	Max	Max	Max	Max	Max
282	338	1.9	4.1	32.6	40.1

Sulfur, weight	Copper strip corrosion	Cetane number
Max	Max	Min
0.50	No. 3	40

(1) Fuel Cap

W1048002





Checking and Cleaning Radiator to Prevent Overheating

CAUTION

- **Be sure to stop the engine and remove the key before cleaning.**

■ IMPORTANT

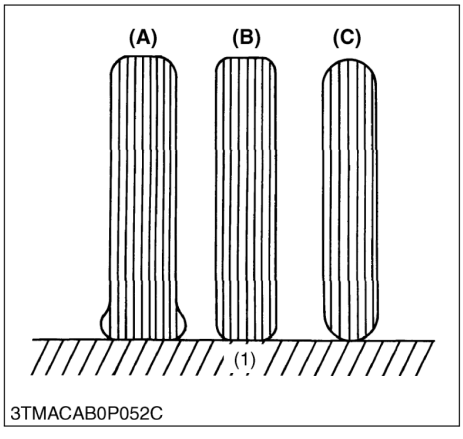
- **The air intake area must be clear of debris to prevent the engine from overheating.**

Daily or after every 5 hours of operation, check to be sure the radiator screen (1) and bonnet screen (2) are clean. Dirt or chaff on the radiator screen (1) or bonnet screen (2) decrease cooling performance.

1. Open the bonnet and remove the radiator screen (2).
2. Remove the dust from between the fins and the tube.
3. Tighten the fan drive belt as necessary. For this, refer to "**CHECK POINT EVERY 100 HOURS**".
4. If scale forms in the tube, clean with scale inhibitor or its equivalent.
5. Each time the bonnet screen (2) is covered with grass during operation, remove the grass from bonnet screen by hand. Check the radiator screen (1) from time to time if grass accumulates.

(1) Radiator Screen (2) Bonnet Screen

W1050141



Checking Tire Pressure

WARNING

- **Do not attempt to mount a tire on a rim. This should be done by a qualified person with the proper equipment**
- **Always maintain the correct tire pressure. Do not inflate tires above the recommended pressure.**

CAUTION

- **Never operate machine with a loose rim, wheel or axle.**
- **Whenever bolts are loosened, retighten to specified torque.**
- **Check all bolts frequently and keep them tightened.**

■ Inflation Pressure

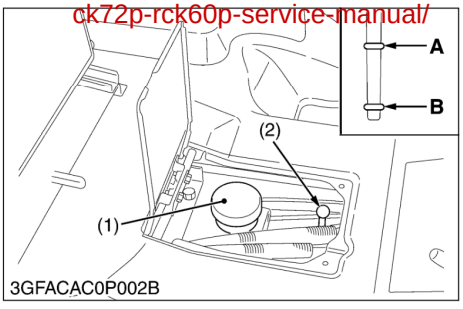
Though the inflation pressure is factory-set to the prescribed level, it naturally drops slowly in the course of time. Thus, check it every day and inflate as necessary.

	Tire Sizes	Recommended inflation pressure
Front	24 × 12-12, 4PR	140 kPa (1.4 kgf/cm^2, 20 psi)
Rear	18 × 9.5-8, 4PR	200 kPa (2.0 kgf/cm^2, 28 psi)

(1) Ground

(A) Insufficient
(B) Normal
(C) Excessive

W1051028



Checking Transmission Fluid Level

1. Park the machine on a flat surface, lower the implement to the ground and shut off engine and remove the key.
2. To check the oil level, draw out the dipstick (2), wipe it clean, reinsert it, and draw it out again. Check to see that the oil level lies between the two notches. If the level is too low, add new oil to the prescribed level at the oil inlet (1). (See page G-7.)

■ **IMPORTANT**

- **If oil level is low, do not run engine.**

(1) Oil Inlet
(2) Oil Level Dipstick

A : Upper Level
B : Lower Level

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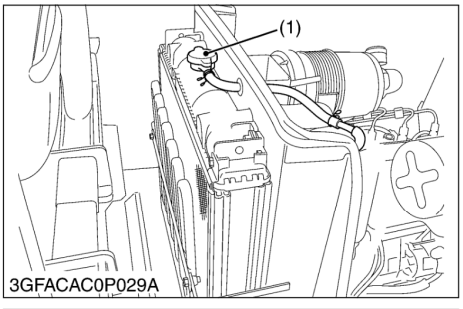

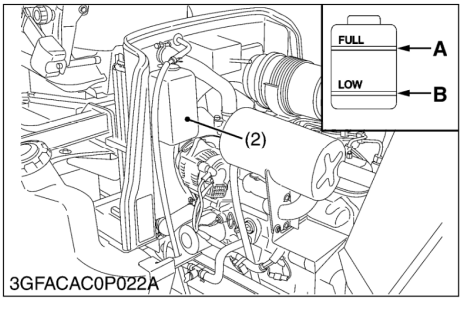

Checking Coolant Level

CAUTION

- **Do not remove the radiator cap when the engine is hot. Loosen cap slightly, to the stop, to relieve any excess pressure before removing cap completely.**

Check the coolant level daily both the radiator and the recovery tank (2) before starting engine

1. Remove the radiator cap (1) and check to see that the coolant level is just below the fill port.
2. Check to see that the coolant level is between the **"FULL"** and **"LOW"** marks of recovery tank (2).
3. When the coolant level drops due to evaporation, add water only up to just below the fill port of the radiator and the full level of the recovery tank (2).
   In case of leakage, add coolant and water in the specified mixing ratio up to the full level. (See page G-7.)

■ **IMPORTANT**

- **If the radiator cap has to be removed, follow the caution above and securely retighten the cap.**
- **Use clean, coolant and distilled water to fill the radiator and recovery tank.**

(1) Radiator Cap
(2) Recovery Tank

A : FULL
B : LOW

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